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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/664,517	09/17/2003	Thomas P. Pearsall	SP02-196	4880
22928	7590	04/05/2005	EXAMINER	
CORNING INCORPORATED			STULTZ, JESSICA T	
SP-TI-3-1			ART UNIT	
CORNING, NY 14831			PAPER NUMBER	
			2873	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/664,517	<b>Applicant(s)</b> PEARSALL, THOMAS P.	
	<b>Examiner</b> Jessica T. Stultz	<b>Art Unit</b> 2873	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 13 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 6-9 and 12 is/are rejected.
- 7) ☒ Claim(s) 4, 5, 10 and 11 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 0903.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12, claims 7-12, drawn to an optical signal modulator, classified in class 359, subclass 247. Claims 1-6 are being grouped with the modulator claims since these claims can be searched together with claims 7-12 without any undue burden on the examiner.
- II. Claims 13-14, drawn to an optical waveguide, classified in class 385, subclass 129.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the optical signal modulator does not specifically require a planar optical waveguide. The subcombination has separate utility such as being used in a device other than an optical modulator and without a control unit to control the transmission characteristic of the resonant cavity.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

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Because these inventions are distinct for the reasons given above and the search required for any one group is not required for any other group, restriction for examination purposes as indicated is proper.

During a telephone conversation with Walter Douglas on March 28, 2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-12.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-14 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

#### *Claim Objections*

Claims 4-5 and 10-11 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from another multiple dependent claim. Specifically, multiple dependent claim 4 depends from multiple dependent claim 3 and multiple dependent claim 10 depends from multiple dependent claim 9. See MPEP § 608.01(n). Accordingly, claims 4-5 and 10-11 have not been further treated on the merits.

#### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 and 7-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Mekis et al.

Regarding claim 1, Mekis et al discloses a method of modulating an optical signal comprising the steps of: providing a waveguide defining a light path for the optical signal (Column 9, line 37-Column 10, line 50, wherein the waveguide “1210” defines a light path for an optical signal, Figures 12A-B); providing a resonant cavity in the light path (Column 9, line 37-Column 10, line 50, wherein the resonant cavity is formed by an array of holes “1212”, Figures 12A-B); and altering the transmission characteristics of the resonant cavity whereby to control the degree of transmission of light of a selected frequency propagating in the light path (Column 9, line 37-Column 14, line 5, wherein an electric field, shown in Figure 13, is applied to the dielectric material of the resonant cavity of the waveguide to change the transmission characteristics of the cavity based on the light frequency, Figures 10A-B, 11, 12A-B, and 14).

Regarding claim 7, Mekis et al discloses an optical signal modulator comprising: a waveguide defining a light path for the optical signal (Column 9, line 37-Column 10, line 50, wherein the waveguide “1210” defines a light path for an optical signal, Figures 12A-B); a resonant cavity in the light path (Column 9, line 37-Column 10, line 50, wherein the resonant cavity is formed by an array of holes “1212”, Figures 12A-B); and a control unit for altering the transmission characteristics of the resonant cavity whereby to control the degree of transmission of light of a selected frequency propagating in the light path (Column 9, line 37-Column 11, line 14, wherein an electric field, shown in Figure 13, is applied to the dielectric material of the resonant cavity of the waveguide to change the transmission characteristics of the cavity based on the light frequency, Figures 10A-B, 11, 12A-B, and 14).

Regarding claims 2 and 8, Mekis et al further discloses an optical signal modulator and method of modulating an optical signal as shown above, wherein the waveguide is a photonic

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crystal waveguide (Column 8, lines 17-32 and Column 12, lines 7-33, wherein the waveguide is a photonic crystal waveguide, Figures 17A-B).

Regarding claims 3 and 9, Mekis et al further discloses an optical signal modulator and method of modulating an optical signal as shown above, wherein the resonant cavity comprises a plurality of holes (Column 3, lines 59-61 and Column 10, lines 11-42, wherein the resonant cavity is defined by a plurality of holes, Figure 12B) defining a photonic band gap device in the waveguide (Column 9, line 37-Column 11, line 14, wherein the holes define a photonic band gap in the device, Figure 14).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mekis et al in view of Blair et al.

Regarding claims 6 and 12, Mekis et al further discloses an optical signal modulator and method of modulating an optical signal as shown above, wherein the control unit is used to apply a biasing electric field whereby to alter the Q-factor of the cavity (Column 9, line 37-Column 11, line 14 and Column 12, lines 7-51, wherein the Q factor of the resonant cavity is varied to change the transmission of light through the cavity, Figures 10A-B, 11, 12A-B, 13-14), but does not specifically disclose that the modulator includes a p-n junction in the waveguide at the resonant cavity to which a bias electric field is applied. Blair et al teaches of a waveguide with a

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resonant cavity (Column 7, line 38-Column 8, line 4, wherein the waveguides "202" and "203" have a cavity "201", Figures 5A-C and 6), specifically including a p-n junction for the purpose of providing a method for injecting carriers to change the refractive index of the cavity (Column 7, line 38-Column 8, line 4, wherein the cavity "201" includes a p-n junction, Figures 5A-C and 6). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the optical signal modulator of Mekis et al to further include a p-n junction in the waveguide at the resonant cavity to which a bias electric field is applied since Blair et al teaches of a waveguide with a resonant cavity specifically including a p-n junction for the purpose of providing a method for injecting carriers to change the refractive index of the cavity.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Fan et al and Miller et al are cited as having some similar structure to the claimed invention since they disclose a modulating waveguide with a resonant cavity.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T. Stultz whose telephone number is (571) 272-2339.

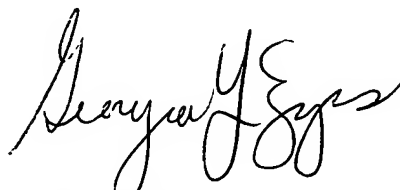
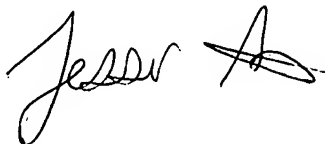
The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jessica Stultz  
Patent Examiner  
AU 2873  
March 28, 2005



Georgia Epps  
Supervisory Patent Examiner  
Technology Center 2800